

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### DRAWINGS ATTACHED

#### Improvements in or relating to Sterilising Articles Made Of Cotton or Other Textile Material

We SANDERSON & CO. (TEXTILE ENGINEERS) LIMITED, of Deanroyd Works, Walsden, Todmorden, in the County of Lancaster, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Cotton gowns, bandages, or dressings are usually sterilised in hospitals and like establishments, by placing them in a double-walled chamber or autoclave, which after sealing, is subjected to a substantial degree of vacuum and then steam is introduced into the evacuated chamber, and after a predetermined period of time, the steam is evacuated and filtered air admitted up to atmospheric pressure, whereupon the chamber is opened and the sterilised articles removed.

This procedure, however, has been found unsatisfactory when dealing with small loads, that is when the chamber is not substantially filled with articles to be sterilised. In such circumstances sterilisation is not always fully effected, and it is thought that the reason for this is that when the steam is admitted, the residual air in the evacuated chamber is carried into the articles to be sterilised and so prevents complete penetration by the steam. With a full load for sterilisation, the residual air will be spread over the relatively large bulk of the articles, and thus will not prevent penetration by the steam. However, with a small load, the probability is that the total residual air will be concentrated in the relatively small bulk of the load, and such concentration may be sufficient to prevent penetration by the steam and so prevent complete sterilisation. This could of course, be avoided by pumping out the air to a very low pressure.

dependent upon the bulk of the load, but this is undesirable for several reasons. Firstly, the time for the operation would be substantially increased and secondly it is desirable to employ the same pump for evacuating both the air initially, and subsequently the steam, and a pump capable of evacuating air to the extent necessary, may not be suitable for evacuating steam.

The present invention is designed to provide a method for sterilising articles made of cotton or other textile material which will be effective irrespective of the size of load in the sterilising chamber, without having to use pressures lower than approximately 20 to 25 m.m. of mercury.

According to the invention after the articles to be sterilised have been placed in the sterilising chamber air is withdrawn from the chamber until the pressure is no higher than 25 m.m. of mercury, steam is then supplied to the chamber, then is withdrawn, and steam is then admitted to the desired sterilising pressure for a predetermined period of time, after which the steam is withdrawn and filtered air, that is, substantially free from bacteria, is admitted up to atmospheric pressure. It is preferred that the initial vacuum of not more than 25 m.m. of mercury should be held for 2 or 3 minutes, and that the first charge of steam should be introduced up to approximately atmospheric pressure and should be withdrawn immediately that pressure is reached. Withdrawal of the first charge of steam may be continued until the pressure is not greater than 25 m.m. of mercury, prior to the admission of the sterilising steam. Evacuation of the sterilising steam charge should follow normal practice in which the pressure in the chamber is reduced to an extent sufficient to dry the materials being treated.

[Price 4s. 6d.]

The procedure of the present invention is particularly applicable to autoclaves such as that described in the specification of our Patent Application No. 14880/59, Serial No. 5 389,044 which is designed as a relatively small autoclave which can be evacuated rapidly and to which steam can also be fed rapidly, thus enabling a relatively small load to be sterilised in the minimum period of 10 time.

A schematic layout of apparatus for carrying out the method of the present invention will now be described, by way of example only, with reference to the accompanying drawing which is a diagram of the 15 various elements and connections between them.

Referring to the drawing, 10 represents an autoclave with surrounding heat insulation, and 11 is an insulated cover for the autoclave. A port 12 in the autoclave 10 is connected by a pipe 13 to a valve 14 which is connected to a vacuum pump 15 and a steam trap 16. A branch line from the pipe 25 13 leads to a valve 17 which is connected by a pipe 18 to a source of filtered air.

A second port 19 in the autoclave 10 is connected by a pipe to a valve 20 which in turn is connected to a steam supply source 30 and a steam trap 21. A recording device is indicated at 22 and is connected by wires 23 to a unit 24 responsive to conditions within the autoclave. The recorder is a composite instrument or assembly of instruments 35 which provide visible indication of the pressure within the autoclave as well as making a record of the pressures during operation of the apparatus.

In operation, the articles to be sterilised 40 are placed in the autoclave, the valves 17 and 20 are closed, the valve 14 is opened, and the vacuum pump is operated to withdraw air from the autoclave until the pressure indicated by the recorder 22 reaches a pre-determined pressure, less than 25 m.m. 45 of mercury and held for, say 2 or 3 minutes at said pressure. The valve 14 is then closed and the valve 20 is opened to admit steam until the pressure indicated by the recorder 50 22 is approximately atmospheric pressure, and at this point the valve 20 is closed and the valve 14 re-opened and the vacuum pump operated to withdraw the steam from the autoclave. The withdrawal of steam is 55 continued until the pressure is reduced below 25 m.m. of mercury, whereupon the valve 14 is closed and the valve 20 opened to admit steam for the sterilising operation. This, is, in effect, the start of the 60 actual sterilisation operation, the previous steps being preliminary operations de-

signed to ensure that the sterilisation operation will be effective irrespective of the volume of the materials to be sterilised. As stated above, the remaining steps, that is, 65 the actual sterilisation operation, should follow normal procedure.

It will be appreciated that the degree of evacuation both initially and after flushing with the first steam supply will depend upon circumstances, e.g. the bulk of the load 70 in the sterilising chamber, but it is preferred that a standardised routine should be followed for this and also for the periods of time of the several stages of treatment. 75 Consequently, it is preferred that the initial vacuum should be to a pressure of 20 m.m. of mercury so as to provide a safety margin for different circumstances and that this should be held for at least 2 or 3 minutes. 80 The final steam pressure and the period of time this is held to effect sterilisation may follow normal practice according to the material being treated. It has been found 85 that with small loads, the flushing action of the first steam supply, followed by evacuation, is effective to reduce the air in the sterilising chamber to such extent as not to impede the subsequent sterilisation.

#### WHAT WE CLAIM IS:

1. The method of sterilising articles in which, after the articles to be sterilised have been placed in a sterilising chamber, air is withdrawn from the chamber until the pressure therein is no higher than 25 95 m.m. of mercury, steam is then supplied to the chamber, then is withdrawn, and steam is then admitted to the desired sterilising pressure for a pre-determined period of time, after which, the steam is withdrawn 100 and filtered air, that is, substantially free from bacteria, is admitted to the sterilising chamber up to atmospheric pressure.
2. The method according to claim 1, in which the initial vacuum of not more than 25 m.m. of mercury is held for at least 2 105 minutes.
3. The method according to claim 1 or claim 2, in which withdrawal of the first charge of steam is continued until the pressure in the chamber is not greater than 25 110 m.m. of mercury prior to the admission of sterilising steam.
4. The method of sterilising articles according to claim 1, substantially as described 115 with reference to the accompanying drawing.

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1 SHEET

## COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale.

